

caves, and the Aurignacian, which probably occupied the greater portion of the last inter-glacial period.

During the last four Palæolithic epochs—namely, the Azilian, Magdalenian, Solutrean, and Aurignacian—Europe was inhabited by distinct races. Whether these peoples left any progeny to carry on the evolution of the human race, or whether they suffered the fate of extermination, is unknown; but they differed only very slightly from modern man and certainly belonged to the species *Homo sapiens*. Between Mousterian man and modern man there is a wide breach. At times the discovery of the remains of modern man have been reported in strata considerably antedating Aurignacian times; but expert evidence has always gone to show that these hypothetical pre-Aurignacian *H. sapiens* will not stand a rigid scrutiny.

Thus Palæolithic times may well be divided into two portions:

1. An early period, in which four different species of the Hominidæ came into existence, and disappeared—namely (a) *Homo Javanensis*, (b) *Homo Heidelbergensis*, (c) *Eoanthropus Dawsoni*, and (d) *Homo Neanderthalensis*.

2. A later period, the greater outstanding feature of which is the total disappearance of all the above species, and in their place the appearance of *Homo sapiens*.

The Aurignacian and his successors constitute essential man; before this we find ourselves among unfamiliar forms, which mark the slow steps of evolution upwards—from the semi-simian precursor to *Homo sapiens* himself.

MIGRATION OF BIRDS

(Paper read at the Ninth Ordinary Meeting of Members, July 9)

BY V. G. L. VAN SOMEREN, M.B.O.U. &c.

The subject of the Migration of Birds is an extremely wide one, of absorbing interest, and one about which we know very little.

Ornithologists have been trying to solve its mysteries for many years past, but without much success: the reason of this being due to the fact that there was no co-operation between the workers.

It was not until 1880, when a special Committee was appointed by the British Association, that the matter received proper attention. This Committee gathered together an immense amount of data, but of such a character as to render their report useless to the ordinary field worker. This report has since been carefully worked out by Eagle Clarke of Edinburgh, and is now of extreme value.

Much has been done within recent years to increase our knowledge with regard to the migration of birds within the British Isles, but practically nothing has been placed on record regarding the movements of birds in other parts of the British Empire.

By bringing before you some of the more interesting facts and suggestions that have been put forward regarding migration, I shall hope to interest some of you in the matter, so that within no distant date we shall be able to place on record the accurate observations of bird movements throughout this country.

Early History.—Reference to the movements of birds may be found in the ancient writings of Homer, and many another of the early philosophers, and also in the Bible; but beyond the fact that birds appeared and disappeared, after a short stay, nothing was known.

We read in Professor Newton's 'Dictionary of Birds' that the Indians of the fur-countries, in forming their crude calendar, name the recurring moons after the birds of passage, whose arrival is coincident with the changes.

That certain movements at fixed periods took place was apparently well recognised, but the manner of arrival and departure were matters of conjecture. Thus Professor Newton informs us that the Tartars and Egyptians noted the arrival of large and small birds at the same time; they could understand the larger ones undertaking and accomplishing a long journey, but what of the small species? How did they travel? The conclusion arrived at was that when the birds flocked

together for the journey, each large bird took one or more of its smaller brethren on its back, and so conveyed them to their winter quarters. The story is very pretty, but hardly correct. We now know that even the smallest of migrants depends on its own powers of flight to carry it from one country to another.

The Egyptian peasant still believes that the Cranes and Storks carry a living load.

It is not many years ago that the annual disappearance of certain species of birds from England was put down to the fact that they hibernated during the winter months, as do certain rodents. Specimens even were produced of birds—such as swallows—in more or less a torpid state, as evidence in support of the supposition; but it was recognised that all were birds in poor condition, which through injury or weakness had not been in a fit state to travel with their fellows when the time of migration arrived, and, being unable to procure a sufficiency of food, suffered accordingly.

The supposition, of course, is false; but even nowadays one sees notices in the papers that birds have been found hibernating!

The autumnal migration of birds is well recognised by a certain class of people in the north of France, Belgium, and Germany. These folk are professional trappers and netters, and, knowing the favourite routes by which hundreds of birds pass, set their nets where the birds are known to feed, and so destroy hundreds—nay thousands!—of migrants to supply the markets with food which is totally unnecessary.

Classes of Migrants.—Migrants may be divided for convenience into three classes: Local, Partial, and Passage.

The first may be taken to represent birds which are resident in a country, but which migrate to various parts of that country for one reason or another, such, for example, as search for food, or for nesting purposes. These, strictly speaking, should not be classed as true migrants. An example of this group is the Curlew, which during the winter is found on the coast, but in early spring wanders to the hills and moorlands, particularly of Scotland. Another example is the Snow Bunting, which breeds in the north of Scotland and comes south in winter.

In this country we have even better examples of local migrants—such as the various species of Starlings, Pigeons, and other fruit-eating species, which wander to localities where a fresh supply of food is to be found ; and, on a much larger scale, the Black-breasted Kavirondo Quail. This group merges into the next, the Partial Migrants. These are species which are represented in a country throughout the year, but whose numbers decrease, to be later on increased by the influx of birds of the same species from other countries. The Ducks of this country may be taken to represent this group. At certain times of the year (the period of which needs further study), duck abound on Lakes Nakuru and Naivasha in thousands, but the majority disappear to reappear in a few months in similar numbers.

Passage Migrants are those species which migrate from one hemisphere to another, passing through various countries en route.

In the case of long-distance or Passage Migrants it might be suggested that those species which migrate farthest south are those which come from the most southerly portion of their northern range, but in reality the converse appears to hold good ; thus we find that birds which come farthest south travel to the most northern limits of their range to breed. Examples will be given later, but one may be given here to illustrate the point. The Curlew Sandpiper, whose northern range is the Arctic seaboard of Norway and Sweden, Russia and Siberia, nests most commonly in Spitzbergen, Nova Zembla, and around the mouth of the Yenesei ; yet migrates to East Africa as far south as Cape Town. This is all the more interesting when we take into consideration the fact that the areas where these birds nest is free from snow and ice for two to three months in the year only (N.B., times of arrival and departure of this bird).

That long-distance migration does take place has been proved by the fact that birds marked in their northern range have been recovered far south, even as far south as Cape Colony ; for example, a young Stork, marked as a nestling in the north of Holland, was shot just outside Cape Town. Again, amongst the specimens illustrating this paper will be found

birds which breed only in the far north, yet are commonly found in this country in winter.

Now with regard to the causes of migration; nothing definite is known, so we can only put forward suggestions.

Take first of all the autumnal or southward movement. In some cases the increasing scarcity of food may be all-powerful and prove a sufficient reason; for it is well known that birds will travel to great distances in order to obtain food. Thus we find it recorded by a recent observer in Northern Siberia that certain waders disappeared when food—particularly insect life—became scarce, as a result of a fall in temperature.

The limited amount of food in a certain area may account for the fact that in certain species of birds, which are double-brooded, the young of the first brood are driven away by their parents, thus assuring nourishment for the second brood; and in the case of Partial Migrants some birds may move south in the autumn, knowing that if they remained there would not be sufficient food for them and for the large number of immigrants from other countries.

That climatic conditions—such as fall of temperature, increasing rains and wind—play an important part is well demonstrated when we consider the movement of birds in the Arctic zone; yet, on the other hand, we have instances where certain sea-birds, such as Puffins, return to their breeding-grounds on exactly the same date in each year, no matter what the weather conditions are like.

These two causative agents may appear to be sufficient when applied to the southward movement, but what governs the return in spring? Here we fail almost entirely and have to fall back on that much abused term Instinct, which, in other words, may be taken to mean 'love of the country of their birth'! This cannot be proved or disproved.

When considering the return movement of migrants from this country, it is interesting to note that when this movement takes place our local birds are breeding and all conditions appear most favourable. Why don't the migrants remain here to breed? That some individuals, belonging to species well recognised as migrants, do breed in this country is now recognised, but whether these individuals or their young ever do

take part in the migratory movement at any time cannot be proved. It is quite possible that when our knowledge of the nesting-habits of the birds of this country is increased, it will be found that quite a number of European birds remain to breed in some part of Africa. Thus, who can say whether the Great Spotted Cuckoo, which is found breeding in South and East Africa, was at one time purely a winter visitor to these countries and not a resident breeding species? (See examples, adults and young.) Has the bird extended its breeding range, and will the African birds in time become a distinct form? Evidence seems to point this way.

Manner of Migrating.—The manner of migrating is interesting. Some species migrate in flocks of their own species; others in mixed flocks; others, again, travel alone. These three methods are of importance when considering the governing factors regarding routes.

How do the birds know the correct route? What guides them? According to certain observers, each species has its definite route or routes; but the routes of certain species may coincide for part of the way or for the whole distance. Our knowledge on these points is small; thus we find authorities disagreeing.

Manner of Travelling.—It seems to be established that all the birds of a given species and from a given locality do not migrate together and at the one time; thus we find the movement to be wave-like; one batch of birds starting the movement, to be followed at varying interval of days by fresh batches. In certain species the young birds are the first to arrive; in others, again, the adults; then when we consider the return or spring movement, we find that with certain species the males travel by themselves and the females by themselves, and in many of these cases the males arrive at their destination first. Not only do we find this to be the case with some European birds, but we see it also with certain of the Weaver Birds in this country. The males arrive at a nesting-site and begin to weave their nests: the females turn up later and help to finish the work.

Directive Agents.—Several suggestions have been put forward; keenness of vision and recognition of landmarks, high development of sense of direction and locality, and knowledge

of the positions of the magnetic poles. All may be contributory factors, but any single one is not sufficient; thus, taking the point of recognition of landmarks and previous knowledge of the route, we find that in many cases the birds are known to travel by night time, as evidenced by the fact that astronomers have reported the passage of large numbers of birds across the face of the moon, and that these birds are travelling at great heights. Again, we know that flocks of birds are attracted to lighthouses at night in immense numbers. Frequently, also, one can hear large numbers of birds fighting at night time.

It is also a noticeable fact that when one does hear the birds fighting it is usually on a dark still night, especially when there is a mist or when rain is falling. These facts, then, rather put the theory of landmarks out of count to a great extent. Another fact which also contradicts the suggestion of landmarks is that already alluded to in connection with the food supply—namely, that in some species the young migrate first, unaccompanied by any adult bird over routes which they cannot possibly know anything about; and in addition we know that the converse is the case with regard to the cuckoo: here the adults leave first, the young follow later; but how? Do they accompany their foster-parents?

There is one point which must not be overlooked when considering landmarks as a possible guide, and that is that one frequently sees certain birds which have flocked preparatory to migrating, ascending in large numbers towards evening, and, after taking short flights at a great height, returning to the place from which they started. Are these birds merely exercising, or are they getting the direction in which to move off later? Major Meinertzhagen has reported that he came across such a flock one afternoon when he was up in an aeroplane, scouting. He also records the interesting fact that this flock consisted of birds belonging to quite distinct species—such as Rollers, Kestrels, and Bee-eaters.

In support of the statement that birds travel by night, I should like to mention that in a certain locality not far from Nairobi, where I took continuous and careful observations during the autumn and spring movement of 1916-17, I was interested to find that on two occasions certain species appeared

in the very early morning, which species were certainly not in the neighbourhood the evening before.

Other evidence against landmarks is the fact that birds can travel over large tracts of ocean.

Some individuals do get blown out of their proper course and turn up at unexpected places—such, for example, as American species occurring on the *east* coast of Britain.

With regard to the suggestion of high development of sense of locality and direction, one would certainly think that this was well exemplified in the case of 'homing pigeons'; but we are informed by authorities on these birds that the ability to travel long distances without losing their way is purely due to recognition of landmarks.

Routes.—According to the observations of certain Russian and German ornithologists, migration-routes follow more or less horizontal lines, but the configuration of the land influences the routes very largely. Thus birds will follow the course of rivers and skirt mountain ranges.

Of the various routes shown on the map¹ I exhibit, comparatively few interest us directly; for the purposes of this paper it can be taken that the eastern routes are those by which birds come to and go from this country. There are of course exceptions (*cf.* specimens of Swifts and Western Nightingale). Most species, after having crossed the European or Asiatic countries, pass across to Africa, travelling either down the east coast or down the Valley of the Nile, to this country or even on to the Cape.

Rate of Travelling.—The rate at which birds travel while on migration has been calculated by a German observer to be 200 miles an hour. This seems incredible, but may be true for short-distance flights. But could the birds keep this speed up for any time? Experiment shows the rate to be about thirty-eight miles per hour, but this was under artificial conditions. I have no doubt that birds travel at the most favourable time, and that they take advantage of air-currents to help them on.

I shall hope to show later on, by means of actual specimens, that individuals of certain migratory species do not leave

¹ Not reproduced in this JOURNAL.

their winter quarters, but remain here throughout the year. Such birds are probably immature, and, not being in a condition to breed, have not undertaken the journey, but others are certainly old birds which, through lack of condition, have been unable to move off with their fellows.

Uganda and East Africa are extremely well placed with regard to migrants, for through and to these countries come birds from Europe, Asia, and to a less degree West and South Africa.

I shall now confine myself to a few general remarks regarding migration as seen in this country.

The first month in which one may expect to see migrants is in the latter part of July and beginning of August, but the greatest numbers are to be seen in October, and one can count on seeing several species up to the end of March and occasionally till May. As already mentioned, a certain number do not leave this country at all.

The best places to look for migrants are along the banks of rivers and lakes and amongst swampy ground and on the outskirts of forests; and for most waders, along the coast.

I should now like to bring to your notice various examples of migrants—European, Asiatic, and South African—which have been procured in this country, mentioning briefly the countries in which they breed, noting their date of arrival and departure at and from these places and comparing them with the dates of collecting the specimens exhibited.

You will thus be able to realise what a rich country this is for the study and observation of the various aspects of one of Nature's most wonderful phenomena.

1. The GOLDEN ORIOLE (*Oriolus galbula*) is a spring visitor to England, some few remaining to breed in suitable localities in the southern counties. Principal nesting-areas: countries south of the Baltic. They nest in May and June.

During their northward migration they have been noted to pass through Egypt in April. They have been collected by me in this country between October and April.

During October of 1916, Orioles passed through my garden at Nairobi on their southward migration; some remained for a few days. In November another flock of eleven arrived, most of them young birds. They were seen or heard for a

week. They then passed on. None passed through this place on the northward move, but specimens were collected at Nakuru in March 1913, and a young male was obtained on the western slopes of Elgon on April 18. The Elgon bird which I exhibit is a young male, still in its second plumage, and though presumably migrating north, shows no signs of assuming the full breeding dress. Had it reached its summer quarters it presumably would not have bred.

Care should be exercised, when recording the arrival of young or female birds, not to confuse them with those of *O. notatus*, which they closely resemble.

2. The TAWNY PIPIT (*Anthus campestris*) has been recorded from East Africa, but specimens were probably wrongly identified. I doubt whether this bird migrates farther south than northern tropical Africa. Local Pipits, very like *A. campestris*, flock just about the time that migrants arrive.

3. The TREE PIPIT (*Anthus trivialis*).—Summer resident England and Wales ; breeds in northern half of Europe ; arriving April, leaving September. Migrates to tropical Africa.

The specimens shown include birds taken from October to April. Very plentiful round Nairobi, particularly common at Naivasha, Nakuru, and Kisumu. October birds are much worn and have a mottled appearance, while the April birds are much more uniform and distinctly ochraceous above and below. These birds in worn plumage can be readily distinguished from the next species by having the rump almost uniform, not speckled.

4. The RED-THROATED PIPIT (*Anthus cervinus*) breeds in the north of Russia, Siberia ; arriving end of May, and leaving middle of August. Fair numbers arrived in Nairobi area. In October they were in fair plumage, though adult birds had commenced to moult.

Most had red-brown throats. A series was collected throughout their stay, and showed that most birds were in full winter dress in December, and they then resembled worn specimens of *A. trivialis*, but were more boldly marked.

Up to the time of departure of the majority, in March, none were in full breeding dress. Did they continue their moult while travelling north ?

The last specimen to be seen was collected on April 18. It was solitary, and is in almost full plumage. Apparently, the first sign of coming maturity is the presence of the red throat, followed later by a lessening of the spots on the breast, which area later becomes pinkish brown and the rest of the plumage generally more fulvous.

Flocks pass through Egypt in April.

5. The WHITE WAGTAIL (*Motacilla alba*) breeds in the north of Europe and in England. Said to breed in Palestine, also breeds in Asia Minor. They arrive in breeding areas in April, leaving in September. Not a very common migrant to these parts; most birds make their appearance in November and remain till February.

It will be noticed that some males are in entire breeding dress in January, while others collected at end of February are scarcely showing any signs of assuming the summer plumage.

6. The BLUE-HEADED WAGTAIL (*Motacilla flava*) breeds in suitable localities throughout Europe. Arrives in May and departs in September. Large numbers pass through Egypt, arriving in these parts in October, usually accompanied by the ashy and yellow species.

So far as I could see, there were no adult birds in full dress in the flock that arrived in the Nairobi District last October; all were young birds and hardly to be distinguished from young *M. raii*. By January some birds had commenced to assume the adult dress, and could then be picked out easily from *M. raii*. In these, as in others of this group, fully two-thirds showed no signs of assuming the adult breeding dress when they left Nairobi in March.

7. The ASHY-HEADED WAGTAIL (*Motacilla cinereacapilla*) breeds in the southern portion of Europe. It is not a common migrant to these parts. A few are to be found with *M. raii*. I collected a single specimen in full plumage on April 25—probably a stray bird; they seem to be more plentiful in the Kisumu district than elsewhere. The series exhibited contains specimens collected between October and April 1916-17.

8. The BLACK-HEADED WAGTAIL (*Motacilla melanocephala*) although not admitted by some authorities as entitled to sub-

specific rank, appears to be quite distinct, and this is supported by its habits when in this country. My experience is that they are not common, that they keep to themselves, not mixing with others of their own family, and that they appear in this country much later on than do other species, and they do not travel so far south.

They breed in the Eastern countries of Europe.

9. The YELLOW WAGTAIL (*Motacilla raii*) is a summer visitor to the western countries of Europe where it breeds. They arrive in May and depart in September. Most go to West Africa, but during the season last year hundreds arrived in the Nairobi district; in October they were present in large numbers right up to the end of March, and, when they left, scarcely half were in full plumage.

Odd birds were procured by me through April and May.

10. The GREY WAGTAIL (*Motacilla melanope*) appears to be quite the most rare of this group, few visiting this country. As a summer resident they inhabit the countries from South Sweden to the Mediterranean. I have never seen them in flocks numbering more than four to six individuals; most frequently they are seen singly. Of the two specimens exhibited one was collected in December, the other as late as June. The latter is not in anything like full plumage.

We now pass on to another group, commonly called BUTCHER BIRDS or Shrikes.

11. The LESSER GREY SHRIKE (*Lanius minor*) is widely distributed, breeding in South and Central Europe, north to Siberia, and east to Asia Minor and Turkestan.

In winter it migrates to tropical Africa, arriving here in October. They can usually be found in pairs or small flocks up to March, but I have also obtained them in April and even in May.

12. The GREAT GREY SHRIKE (*Lanius excubitor*). Examples of this species have been reported from this country, but it seems to me very doubtful whether they are the European bird. There are one or two local forms extremely like it which are resident in this country and whose numbers increase at certain times in the year; but, having collected a very large series, I was unable to find a single specimen which agreed

with the European bird. One specimen, collected at Ankoli in Uganda, was very close, but it was not quite mature.

13. The WOODCHAT SHRIKE (*Lanius senator senator*) breeds in the central countries of Europe, east to south Russia and Asia Minor. Most birds of the European form migrate to North Africa and West Africa, but a few come this way. There are local north-east African forms which also migrate to a certain extent, so one has to be careful when reporting the occurrence of this bird not to confuse it with these.

Odd birds are to be met with here from October to March.

14. The RED-BACKED SHRIKE (*Lanius collurio*) as a breeding species is found over Europe generally; they arrive in April and leave in August and September. They are quite a common migrant to this country, passing through Egypt in September and arriving here in October; they are present up to the end of March in fair numbers, but last spring they were here till late in April.

Layard reports that they breed in Namaqualand, but this is doubtful.

15. The ISABELLINE SHRIKE (*Lanius isabellinus*) breeds in Persia and Turkestan, north to southern Siberia.

I can find no records of dates of arrival and departure at and from these countries. They were plentiful in this country last winter and spring from October to February.

16. The SPOTTED FLY-CATCHER (*Muscicapa griseola*) generally distributed over Europe during summer from April to September. They arrive in Nairobi district about the second week of October and remain till third week of March, though some remain on till April.

17. The WILLOW WARBLER (*Phylloscopus trochilus*) breeds in England and Europe generally; arriving in April, leaving in September. This is the smallest migrant to these shores, and is also one of the most common. They arrive here in great numbers in October, leaving again in March and April. Whilst here they frequent practically all types of country, even grass lands, where there are a few odd shrubs. Two other species of this group are reported from this country, but I have not collected them.

18. The GREAT REED WARBLER (*Acrocephalus turdoides*)

breeds in Central Europe, where it is resident in the summer months from April to September. Fair numbers come here in November and remain till March.

19. The LESSER REED WARBLER (*Acrocephalus streperus*) as a breeding bird is found over Europe generally, between April and September. At the end of the latter month they migrate, some arriving in this country in October, but most make their appearance in November and leave again in April.

20. The MARSH WARBLER (*Acrocephalus palustris*) breeds in England and Europe generally, not including Sweden and Norway. Large numbers come here in November, and are to be found along rivers and swamps up to April; the latest date that I have recorded is May 25.

21. The SEDGE WARBLER (*Acrocephalus phragmitis*), as a breeding bird occurs over Europe generally, between April and September. It is a very common migrant, arriving in September and remaining till May.

22. The PALLID WARBLER (*Hypolais pallida*) breeds in South Europe and South-West Asia, and winters in East Africa, arriving here in November and going north in March.

23. The BARRED WARBLER (*Sylvia nisora*) is found in Germany, and South Sweden, North Italy, south to Russia and Turkestan. It has rarely been taken in East Africa, December to February.

24. The GARDEN WARBLER (*Sylvia hortensis*) breeds in Europe generally; the southward movement commences in September and continues till October. During last autumn the first arrivals in this country turned up in September; fresh arrivals appeared in increasing numbers till November. Dozens remained in my garden till January, after which they gradually decreased, the last lot being seen on April 5, in this district. Later on, I came across a few birds at Kisumu, in May.

25. The BLACKCAP WARBLER (*Sylvia atricapilla*) breeds in Europe generally, east to Asia Minor, west to Cape Verde, and also in North Africa. They begin to leave their breeding grounds in September, and arrive here at the latter part of that month, and particularly in October. They went north in February and March. At one time during last winter these birds were even more numerous than the Garden Warblers.

26. The WHITE THROAT (*Sylvia cinerea*) is found as a breeding species from Scandinavia to the shores of the Mediterranean. They arrive in Europe in April, and leave in September. They are not a very common migrant to these parts, but odd birds may be met with between November and April.

27. The ROCK THRUSH (*Monticola saxatilis*) has occasionally been recorded from England; but its breeding haunts are confined to Central and Eastern Europe, east to Siberia and China, and south to North-West Africa. During the winter it is one of the commonest migrants to these parts, arriving on the plains outside Nairobi about the second week of October and remaining there in more or less constant numbers up to April.

28. The COMMON WHEATEAR (*Saxicola oenanthe*).

29. The ISABELLINE WHEATEAR (*Saxicola isabellina*).

30. The GREENLAND WHEATEAR (*Saxicola leucorhoa*).

The first species is common throughout Europe from March to October; the second breeds on the Continent, but not in England; both are common birds in this country between October and March, the Isabelline arriving first and moving off first.

The third species, which breeds in Greenland, Labrador, and North-East America, has been recorded from East Africa, but it is doubtful. Such birds certainly agree with description of this form, also in size.

31. The PIED CHAT (*Saxicola pleschanka*) is found in summer in Southern Russia, Siberia, Tibet, and China. Fair numbers arrive here in September and remain till April.

32. The WHINCHAT (*Pratincola rubetra*) breeds throughout temperate Europe, arriving during April and leaving in September and October. The birds that arrive here first are young; these arrive in September to be followed by adults and young throughout October. They begin to go north in March, but some remain till April.

33. The REDSTART (*Ruticilla phoenicurus*) occurs in England and the Continent during the summer, it migrates south to North Africa, a few coming as far as East Africa.

The only specimen I have seen or collected was shot in January.

34. The THRUSH NIGHTINGALE (*Lucinia lucinia*) as a breeding species, occurs in the eastern half of Europe, and is the common Nightingale to be met with in these parts in winter. I have collected them between October and March. They sing while here.

35. The WESTERN NIGHTINGALE (*Lucinia megarhyncha*).—Confined to England and western half of Continent in summer ; these birds migrate to West and North Africa. An undoubted example of this form was shot by me in Nairobi in November. It was apparently a stray bird.

36. The EUROPEAN SWALLOW (*Hirundo rustica*) is a summer resident in England and Europe generally, from March to October, though some individuals remain through November and December and occasionally throughout the winter. They commence their southward migration in mid-September from England, but specimens have been collected here in early August (probably birds from South Europe) ; and these are joined on the way by the EGYPTIAN SWALLOW, which is also a partial migrant and most remain with us until April ; but individuals have been taken in June and July, and no doubt some remain with us throughout the year.

37. The HOUSE MARTIN (*Chelidon urbica*) has been noted to arrive in England in March ; but most arrive between April and June, and are distributed over Europe generally. The southward migration takes place from September to mid-October generally, but specimens arrive here in October, and have been observed to be leaving in April.

38. The SAND MARTIN (*Cotile riparia*).—The arrival and departures are similar to the above, but they are much commoner in the winter in these parts than the preceding species.

39. The SWIFT, EUROPEAN AND CHINESE (*Apus apus* and ? *Cypselus pacificus*).—The former are resident in England and Europe from April to September. Most birds migrate to the west coast of Africa, but occasionally flocks take the eastern route and arrive here in August and September. The latter arrives and leaves at practically the same times.

40. The EUROPEAN NIGHTJAR (*Caprimulgus europæus*) arrives in England and Europe in May, and leaves in September. Specimens have been recorded from East Africa from October

to March, whilst they pass through Egypt in August and again in March and April, and are then usually in flocks composed of all males or all females.

41. The EUROPEAN BEE-EATER (*Merops apiaster*).—A few appear in spring in England, but do not breed. Found nesting in Southern Europe and islands of Mediterranean and North Africa. Migrates south in large numbers, appearing here in September, and remaining in more or less constant numbers until April and early May.

This species migrates to Cape Colony, where it is said to breed. This is doubtful.

42. The EUROPEAN HOOPOE (*Upupa epops*) has been recorded from this country between October and March, and some specimens have been taken in July and August.

The majority of Hoopoes seen here belong to the African forms. It is a passage migrant to England, and has bred, but its regular nesting areas are in Southern Europe, Western Siberia, and Turkestan.

43. The EUROPEAN ROLLER (*Coracias garrulus*).—In England it occurs chiefly as an autumn vagrant, but sometimes is seen in spring. Nests in Europe from Central Russia to the Mediterranean, and winters in tropical and South Africa, passing south in October and northward in March. It is a common migrant to these parts.

44. The EUROPEAN WRYNECK (*Iynx torquilla*) inhabits Europe in the summer and winters in tropical Africa. A typical specimen was collected by the Cozens-Lowe Expedition in February.

45. The EUROPEAN CUCKOO (*Cuculus canorus*) has been recorded as arriving in England in late March, but most arrive in April, and adults leave in August to be followed by the young in September and October. From Uganda we have collected this species from *July* to February, and on East Elgon in *May*.

46. The GREAT SPOTTED CUCKOO (*Coccystes glandarius*) is a resident species in Africa, but numbers increased with migrants from north.

47. The BLACK-WINGED STILT (*Himantopus candidus*), although a resident and breeding species in this country, is

also found nesting in Southern Europe. The birds from the north pass the winter in the tropics ; thus the number of birds is increased in this country between October and March.

48. The AVOCET (*Recurvirostra avocetta*) is also a breeding bird in this country, but numbers are certainly increased with arrivals from the north in October.

49. The COMMON CURLEW (*Numenius arquata*) breeds in North Britain and North Europe to Asia, in February to June. Migrates south to all parts of Africa, arriving here, especially on the coast, in large numbers in October and remaining till March, when most go north, but some individuals remain here all the year round.

50. The WHIMBREL (*Numenius phaeopus*) breeds in Iceland, North Europe, and Siberia, wintering in Africa. Makes its appearance here as early as August, and leaves in April ; but with this species also some remain all the year round. Probably these are young.

51. The GREAT SNIPE (*Gallinago major*) breeds in the north of Russia, west to Scandinavia, east to Siberia, and south to Denmark. They are quite common here in winter during December to the third week of May.

52. The COMMON SNIPE (*Gallinago caelestis*) breeds in Iceland to North and Temperate Europe, and Asia ; comes to this country in October, and remains till March and occasionally April.

53. The JACK SNIPE (*Gallinago gallinula*) breeds in the Arctic regions of the Old World, passes south on migration to East Africa. It is not a common bird. I have collected it here from November to February.

54-57. TERNS.—Several species winter here—such as the White-winged Black Tern, the Gull-billed Tern, the Sooty Tern, and others ; but I cannot give dates for these, except the first, which come here in large numbers in November, remaining here till late on in May, most of them then being young.

58. The LESSER BLACK-BACKED GULL (*Larus fuscus*).—Some may be migrants, but others undoubtedly remain here all the year round.

59. The LANDRAIL (*Crex crex*).—I cannot say when these

birds first arrive, but they have been collected between November and January.

60. The SPOTTED CRAKE (*Porzana maruetta*) also occurs here in winter, but dates of arrival and departure are not known. The specimens exhibited were shot in December and January.

61. The WATERHEN (*Gallinula chloropus*) probably does not come this length, the birds found here belonging to the local African form.

62. The COMMON EUROPEAN QUAIL (*Coturnix coturnix*) has been recorded, but it is difficult to distinguish from the Cape Quail, which is a resident and breeding species in these parts.

63. The SPOONBILL (*Platalea leucorodia*) has been recorded. Several Spoonbills have been seen on Lakes Victoria, Naivasha, and Nakuru—probably *P. alba*, but this needs verification.

64. The GLOSSY IBIS (*Plegadis falcinellus*) occurs in the low country along the basin of the Danube, in South Russia, and some islands of the Mediterranean; they are also resident and breed in this country. The presence of winter visitors requires confirmation.

65. The COMMON GREY HERON (*Ardea cinerea*) has been reported, but occurrence is doubtful; specimens exhibited are of the local form (*A. melanocephala*).

66. The PURPLE HERON (*Ardea purpurea*) is resident and breeding here. Numbers may be increased during the winter.

67. DUCKS.—Gargany, Shoveller, and Pintail breed in the sub-Arctic regions of Europe and Asia. Visit the lakes in these parts and are most plentiful in November to January.

68. The EUROPEAN PRATINCOLE (*Glareola pratincola*) has been recorded, but these are probably examples of the African forms. They may be met with throughout the year. Specimens exhibited are birds collected November, January to March; and others have been recorded from the Toro Lakes in June and July.

69. The BARN OWL (*Strix flammea*, sub-sp.), which occurs in this country, has been recognised as a sub-species of the European; but this form also occurs in Eastern Europe. It is doubtful whether it is a migratory bird at all.

70. SCOPS OWL (*Otus scops*) occurs in Europe, especially in the countries bordering the Mediterranean. It apparently wanders to Uganda; but in this country a sub-species occurs (*O. s. ugandæ*), and farther south we have *O. s. capensis*.

71. The KESTREL (*Tinnunculus tinnunculus*) is partially migratory, but numbers are resident in Europe generally. Some certainly migrate to this country in the winter. Fair numbers are to be seen in October, and the latest record which I have is of a bird taken at Kisumu, in April, during which month they commence nesting in Europe.

They are much in evidence during a grass fire.

72. The LESSER KESTREL (*Tinnunculus Naumanni*).—Inhabitant of the countries surrounding the Mediterranean during the summer, and migrating to Tropical Africa in winter. There are local races of kestrels, which are very like this bird in plumage.

73. The MARSH and MONTAGU'S HARRIERS (*Circus aeruginosus* and *Circus cineraceus*) are regular visitors to these parts during the winter, arriving about October and going north in March.

74. The OSPREY (*Pandion haliaetus*).—Fair numbers visit us from Europe, where they are generally resident. They are particularly common on Lakes Victoria and Naivasha during the winter. They have been collected here in November to March. They are said to breed in these parts.

75. The WHITE STORK (*Ciconia alba* and *C. nigra*).—Several specimens have been taken or seen in England, but they nest in Europe generally and in North-West Africa. Large numbers arrive in this country in October and remain till March. They move about with the swarms of locusts. The BLACK STORK also occurs during the same months.

76. The ASIATIC DOTTEREL (*Charadrius asiaticus*) breeds in the south of Russia to Turkestan. They arrive in this country in October and remain till March. They are particularly common in December.

77. The RINGED PLOVER (*Ægialitis hiaticula*), as a breeding bird occurs over Europe generally. It is a common migrant to this country, being found both on inland waters and at the

coast. The earliest record which I have is October and the latest May 28.

I suspect that some birds remain here through the summer.

78. The GOLDEN PLOVER (*Charadrius plumialis*) has been reported, but the occurrence of this species here is doubtful.

79. The GREY PLOVER (*Squatarola helvetica*) breeds in Arctic Europe, Russia, and Asia. Fair numbers are to be seen on the coast between October and March.

80. The RUFF and REEVE (*Machetes pugnax*) breeds in the northern half of Europe and Asia. Is common here in winter from September to March; but I have shot them as early as August and as late as May.

81. The KNOT (*Tringa canutus*) is said to breed in the north of the New World and possibly Asia; thus its occurrence here is interesting. I have not collected it, but one specimen has been shot by A. Blayney Percival in December. Whether it is a regular migrant to this country I cannot say.

82. The TURNSTONE (*Streptilas interpres*) breeds in Greenland and Arctic regions. A few specimens have been taken in this country. A small flock of four were seen by me at Lake Nakuru, but they were extremely wild.

83. The SANDERLING (*Calidris arenaria*).—Greenland and Arctic regions and Spitzbergen have been given as the breeding places of this species. They are common here, along the coast and on inland waters, where there is a sufficient stretch of sand or mud. The earliest record which I have is November and the latest March.

84. The DUNLIN (*Tringa alpina*) is a resident and winter visitor to Europe; a few come here between November and January and remain till March.

85. The CURLEW SANDPIPER (*Tringa subarquata*) breeds in the extreme north of Europe and Asia, from which localities they depart for the south in August. From my records, I find that the first arrivals to turn up here were in August, but just a few. The majority arrived in October and remained in large numbers up to March. Odd flocks of half a dozen birds each were noted, and specimens obtained therefrom during May of this year at Nakuru Lake. In looking at this series it will be noticed that although the majority of birds

are well on in assuming the summer dress by March, yet some of those collected in the latter part of May show little signs of change (*cf.* Stints); indeed, one male, instead of assuming the red-brown feathers of the spring plumage, is still shedding those of the previous year.

86. The LITTLE STINT (*Tringa minuta*) breeds in the north of Siberia and Europe, leaving these districts towards the end of August; they arrive here in fair numbers in October, some birds showing remains of the summer plumage, others in full winter dress. In December and January they begin to assume the spring plumage, but some are very late in doing this; thus amongst the series exhibited there is a male in almost full plumage shot in February; others again, collected in May, show no change. Most May birds are fairly full-plumaged. I cannot say when these birds left Lake Nakuru, but I am almost certain that some would remain there throughout the summer.

87. The COMMON SANDPIPER (*Totanus hypoleucus*) is found over Europe generally, and winters in the Tropics. Some birds are undoubtedly resident in this country, for we have taken a female with newly hatched young, and, again, I have records of specimens being seen at Nakuru Lake in June and July. Fair numbers of migrants come here in September and remain till March, when they disappear.

88. The WOOD SANDPIPER (*Totanus glareola*) breeds in Northern Europe and Asia. Common migrants to these parts. Most arriving in November and remaining on, apparently, till April and even May.

89. The GREEN SANDPIPER (*Totanus ochropus*), during the summer, breeds in Northern Europe and Asia. It is a common migrant, arriving here early in October and remaining in more or less steady numbers until March; they then may be seen in odd pairs up to May, and once I saw a specimen in Nairobi area in June; it was, however, a bird that had had an injury to its wing, and although able to fly had not gone north.

90. The GREENSHANK (*Totanus glottis*) breeds in North Europe and Asia, including the north of Scotland. Has been taken here between December and March. Though not having actually shot a specimen, I saw them at Nakuru Lake in December, in small flocks of three to five individuals.

91. The REDSHANK (*Totanus calidris*) breeds in suitable localities in Europe, Asia to China, and in Iceland. Though some birds remain in some of these localities for the whole year, most migrate south. They are found along the coast, but I have not shot them.

They have been recorded from December to February.

92. The MARSH SANDPIPER (*Totanus stagnatalis*) breeds in Siberia and Turkestan. My records and specimens show that this bird occurs here from August to end of May. The May birds are not in anything like full plumage, and I doubt if they would have left for some time, if at all.

The above dates and records are of birds which I have actually collected or seen, and must be accepted accordingly. It is quite possible that with further study and observation the dates given will have to be extended. No exhaustive observations have been made to determine the migration routes, and until this is done we shall not be in a position to make accurate observations of times of arrival and departure.

It is to be hoped that those members who are interested in the subject will in future make special efforts to collect migrants and to keep accurate notes on their movement, and will send in their records for publication in the JOURNAL.

THE GAME-FISH OF MOMBASA ETC.

BY E. K. BOILEAU

II

In my previous notes, in Vol. V., No. 10, of the JOURNAL, I referred to a list of the native and scientific names of the sporting-fish to be met with on our coast, but by an oversight it was omitted from the manuscript, and will now be found at the end of this article.

This list is compiled partly from Mr. Cuninghame's one in Vol. IV., No. 7, and from Günther's book on Fishes. It is submitted with all due deference to scientists in so far as the